

## REMARKS

Claims 1, 3-5, 8, 10, 11, 13-18, 20, 21, and 23-27 are pending in the application. Claims 1 and 18 are currently amended. Claim 2 is cancelled. Applicants respectfully request for allowance of all the pending claims.

### Rejections under 35 U.S.C. §102

Claims 1-3 and 5 are rejected under 35 U.S.C. 102(b) as being anticipated by US Patent No. 4,106,918 to Fujikawa et al. (hereinafter referred to as “Fujikawa”).

Independent claim 1, as amended, is directed to a method of scrubbing a halogen-containing gas stream, comprising: contacting the gas stream with water at a temperature of at least 40°C for facilitating chemical reaction between the gas stream and the water at a temperature of at least 40°C; and a further treatment step comprising contacting the gas stream with water at a temperature of less than 30°C for dissolving the gas steam in the water of less than 30°C.

Fujikawa fails to teach or suggest “the water at a temperature of at least 40°C” as claim 1. Fujikawa teaches supplying water of 37°C to condenser 42, and water of 27°C to condenser 14. *See, col. 4, line 67-col. 5, line 1, and col. 5, lines 15-17.* None of the temperatures exceeds 40°C.

Furthermore, Fujikawa does not teach a method of scrubbing a “halogen-containing” gas stream. Fujikawa discloses a method of scrubbing halides (e.g., fluoride), instead of halogens (e.g., fluorine). *See, abstract.* Halide is a chemical compound of a halogen with a more electropositive element or group, which is not to be confused with halogen.

The distinction between halogen and halide is significant, because the claimed invention utilizes water at a temperature of at least 40°C for facilitating chemical reaction between a halogen-containing gas stream with water. As a result, part of the halogen-containing stream would be turned into halide and absorbed away by the water. Such chemical reaction is not to be found in Fujikawa, because it is about scrubbing fluorides, instead of fluorine.

As such, claim 1 is not anticipated by Fujikawa under section 102. Accordingly, claims 3 and 5 that depend from independent claim 1 and include all the limitations recited therein are not anticipated by Fujikawa, either.

Claims 1-3 and 5 are rejected under 35 U.S.C. 102(b) as being anticipated by US Patent No. 4,381,190 to Carron et al. (hereinafter referred to as "Carron").

The invention as described in claim 1 is about scrubbing a halogen-containing gas stream, such that halogen can be dissolved in and absorbed by the scrubbing water. Carron teaches an opposite process, in which water is to be extracted from a wet chlorine gas in order to produce dry and compressed chlorine gas. *See, abstract*. The differences between the claimed invention and Carron are numerous. For example, the claimed invention uses water for scrubbing, whereas Carron uses concentrated sulfuric acid. *See, abstract*. In Carron, water scrubbing simply would not work, because it cannot extract water from the wet chlorine gas.

As such, claim 1 is not anticipated by Carron under section 102. Accordingly, claims 3 and 5 that depend from independent claim 1 and includes all the limitations recited therein are not anticipated by Carron, either.

### **Rejections under 35 U.S.C. §103**

Claims 1-5, 18, 21 and 25-27 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 6,284,022 to Sachweh et al. (hereinafter referred to as "Sachweh").

Independent claim 1, as amended, is directed to a method of scrubbing a halogen-containing gas stream, comprising: contacting the gas stream with water at a temperature of at least 40°C for facilitating chemical reaction between the gas stream and the water at a temperature of at least 40°C; and a further treatment step comprising contacting the gas stream with water at a temperature of less than 30°C for dissolving the gas steam in the water of less than 30°C.

Sachweh fails to teach each and every element of the claimed invention. As acknowledged by Examiner on page 3 of the Office Action, the claimed invention discloses a two-step scrubbing method, whereas Sachweh teaches a single-step scrubbing method. However, Examiner asserts "it would have been obvious to have a second scrubber with water temperature less than 30°C." Applicants respectfully disagree.

The objective of Sachweh is to consolidate multiple steps of scrubbing process into a single-step method, and therefore any attempt to modify Sachweh into a two-step method would defeat its purpose. Sachweh sees a drawback in conventional methods that they only allow the removal of either gaseous contaminants or particulate aerosols. *See, col. 2, lines 10-12.* Sachweh drives the point further by saying "in practice this entails high investment costs, since it is necessary to provide two, generally different types of installation. *See, col. 2, lines 13-17.* It is clear that Sachweh teaches away from a two-

step method. Thus, any attempt to modify Sachweh into a two-step method would not have been obvious.

Independent claim 18 is directed to an apparatus that carries out the two-step scrubbing method as described in claim 1. For the same reasons discussed above, it would not have been obvious for a person skilled in the art to modify Sachweh to arrive at the claimed apparatus.

Accordingly, claims 3-5, 21 and 25-27 that depend from independent claims 1 and 18 and include all the limitations recited therein are patentable over Sachweh under section 103.

Claims 8, 10, 11, 13-17, 20, 23, and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sachweh in view EP Patent Application Publication No. 1023932 to Smith et al. (hereinafter referred to as "Smith").

As discussed above, independent claims 1 and 18 are patentable over Sachweh under section 103. Accordingly, claims 8, 10, 11, 13-17, 20, 23 and 28 that depend from claims 1 and 18 and include all the limitations recited therein are patentable over Sachweh and Smith under section 103.

### CONCLUSION

Applicants have made an earnest attempt to place this application in an allowable form. In view of the foregoing remarks, it is respectfully submitted that the pending claims are drawn to a novel subject matter, patentably distinguishable over the prior art of record. Examiner is therefore, respectfully requested to reconsider and withdraw the outstanding rejections.

Should Examiner deem that any further clarification is desirable, Examiner is invited to telephone the undersigned at the below listed telephone number.

Applicants do not believe that any additional fee is due, but as a precaution, the Commissioner is hereby authorized to charge any additional fee to deposit account number 50-4244.

Respectfully submitted,

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